

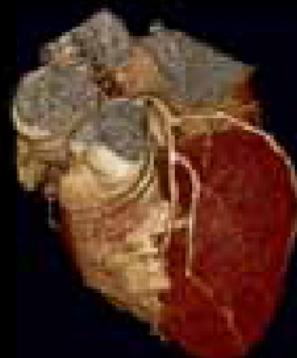
Pianificazione ed esecuzione di un esame di Cardio - TC

Dr. Carlo Tedeschi

U.O. di Cardiologia
(Direttore Dr. Paolo Capogrosso)

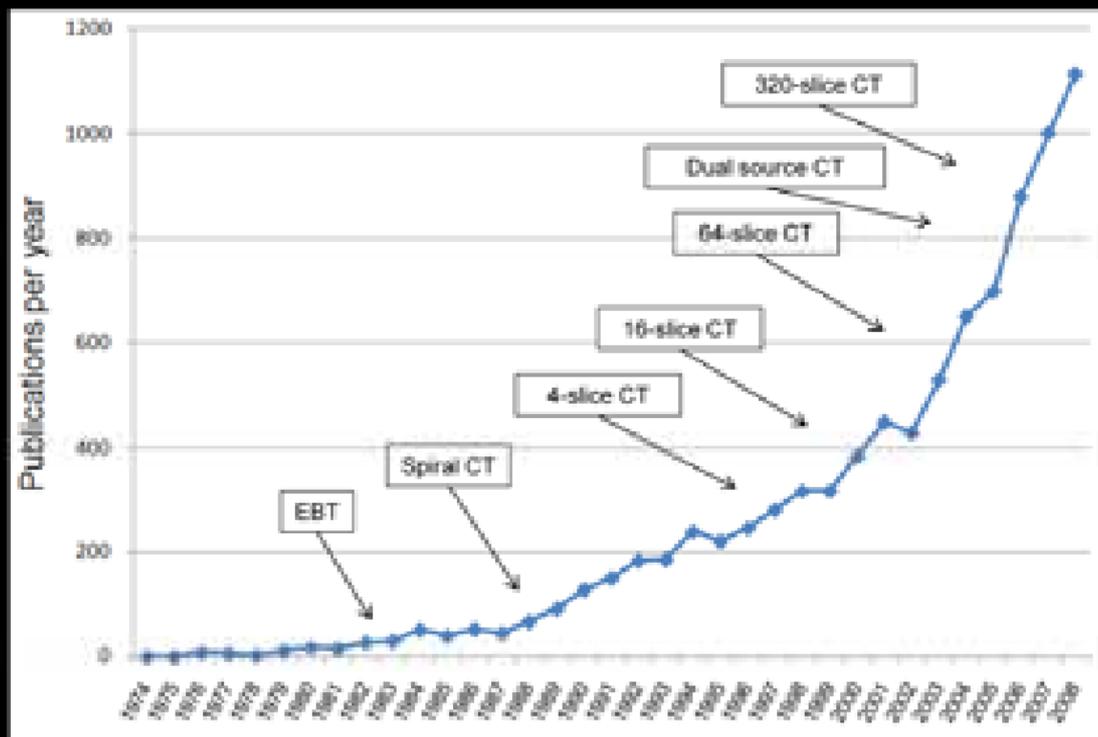
U.O. di Radiologia
(Direttore Dr. Roberto Pepe)
Ospedale "San Gennaro"

A.S.L. Napoli 1 – Centro



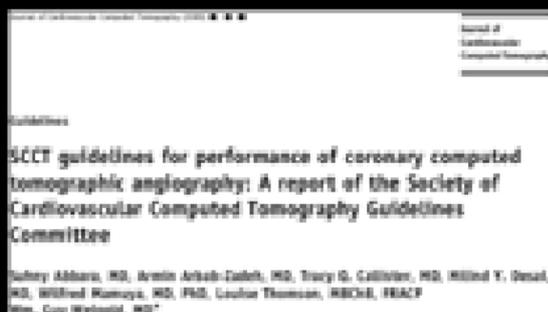
Evolution of cardiac-CT

Publications per year in the field of cardiac CT (Medline)



Requisiti hardware

- **ELEVATA RISOLUZIONE SPAZIALE**
 - Visualizzazione dei piccoli vasi coronarici
- **ELEVATA RISOLUZIONE TEMPORALE**
 - Riduzione artefatti da movimento
- **ELEVATA RISOLUZIONE DI CONTRASTO**
 - Visualizzazione della parete dei vasi
- **ELEVATA VELOCITA' DI SCANSIONE**
 - Completare l'esame in apnea
- **SINCRONIZZAZIONE CON IL CICLO CARDIACO**
 - Fermare il cuore in una fase del ciclo cardiaco



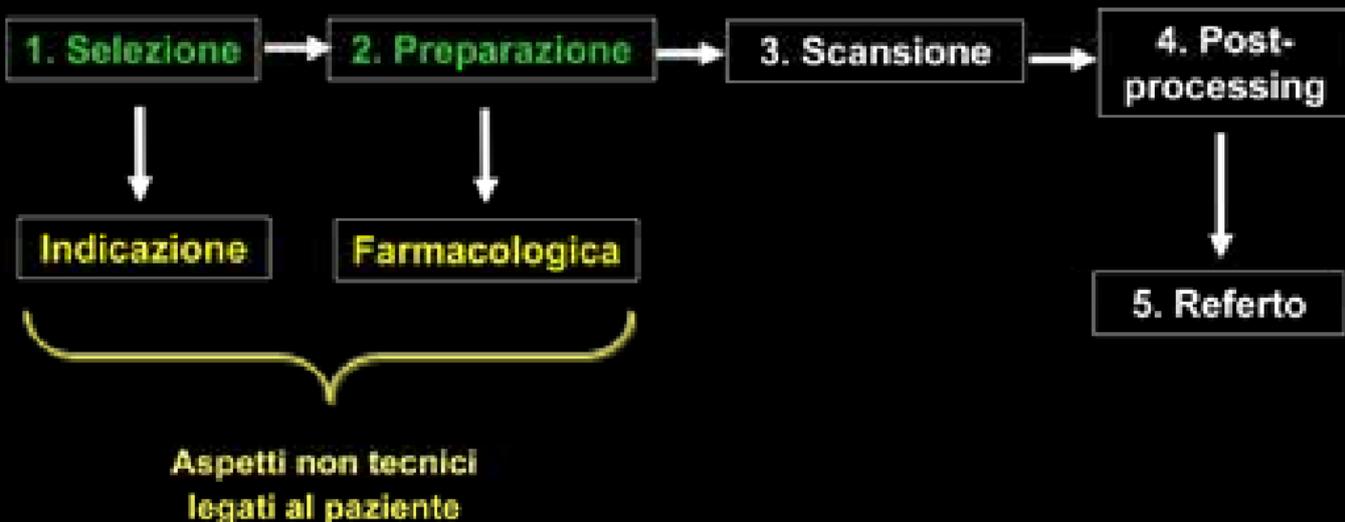
- Coronary CTA should only be performed if the results of the test have the potential to affect patient management or prognosis.
- Initial screening should take place for contraindications to coronary CTA and for factors that may reduce its diagnostic accuracy.

Controindicazioni

- Frequenza cardiaca > 70 bpm
- Fibrillazione atriale ad alta risposta ventricolare
- Allergia nota al mdc iodato
- Insufficienza renale (creatinina sierica >120 mmol/L) 1.35 mg/dl

- Insufficienza respiratoria
- Stato clinico instabile
- Insufficienza cardiaca severa
- Obesità
- Scarsa capacità di collaborazione (posizione supina, arti superiori distesi)
- Disfunzione tiroidea
- Gravidanza

Pianificazione ed esecuzione di un esame di Cardio - TC



1. Selezione del paziente

Aspetti non tecnici della metodica che influenzano l'indicazione all'utilizzo



1. Selezione del paziente

Aspetti non tecnici della metodica che influenzano l'indicazione all'utilizzo



1a. Accuratezza diagnostica

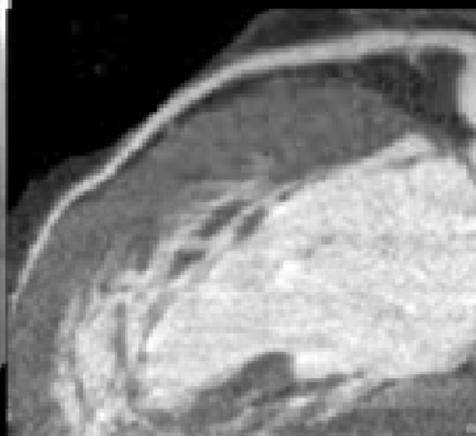
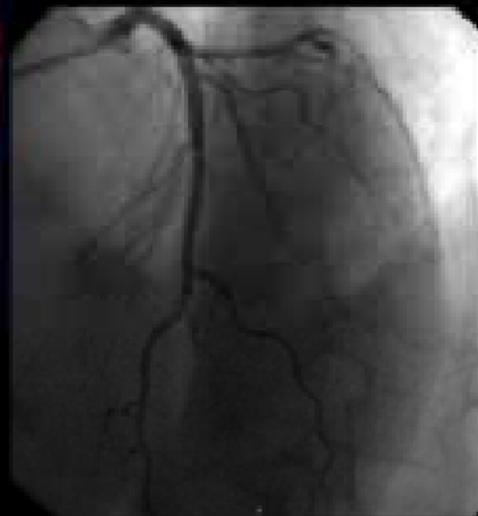
Recent CT scanner generations: (Dier AJM 2008, Hamon Radiology 2007, Gopalakrishnan Cardiology in Review 2008)

	n	not-evaluative	sensitivity	specificity	PPV	NPV
all 4-slice CT	554	21.2%	79%	94%	52%	96%
all 16-slice CT	707	9.6%	88%	97%	70%	97%
alle 64-slice CT	642	3.1%	89%	97%	76%	99%

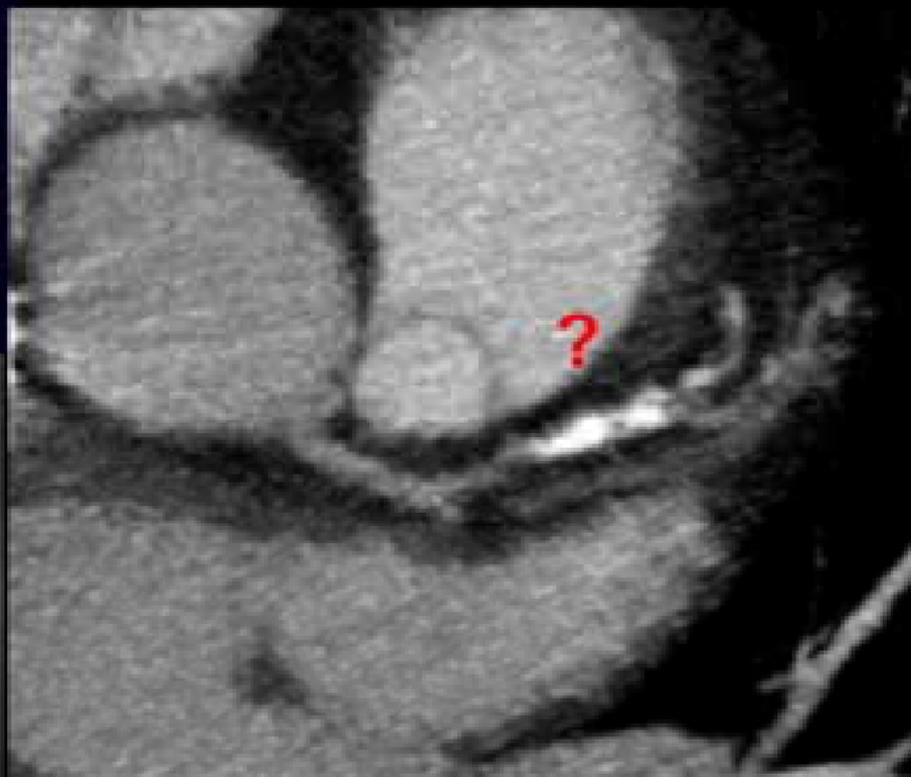
Dual Source CT scanner:

Author	year	n	not-evaluative	sensitivity	specificity	PPV	NPV
Scheffel	2006	30	1%	96%	98%	86%	99%
Leber	2007	90	2%	90%	98%	91%	99%
...
all DSCT		679	1.9%	93%	97%	85%	99%

Reliable to rule out significant CAD (NPV>95%)



Still imperfect to assess site-by-site severity stenosis

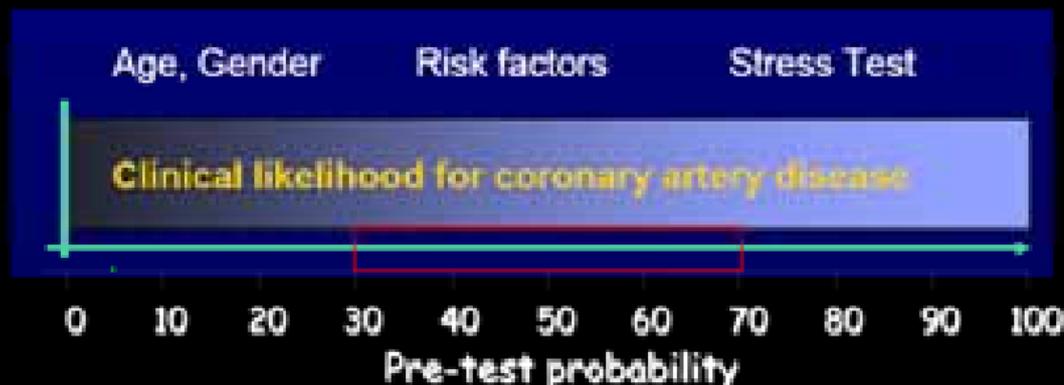


Pre-test probability

Età	Assenza di Angina		Angina atipica		Angina Tipica	
	Maschi	Femmine	Maschi	Femmine	Maschi	Femmine
30-39	4	2	34	12	76	26
40-49	13	3	51	22	87	35
50-59	20	7	65	31	93	73
60-69	27	14	72	51	94	86

Probabilità pre-test di MAC in pazienti con dolore precordiale a seconda dell'età, sesso e sintomi

Modificata da Diamond GA et al. N Engl J Med 1979; vol. 100, 2500 e Wilson DA et al. N Engl J Med 1979; 301-305.



Prevalenza di malattia

Author	Pts no.	Prev %	Sen %	Spec %	VPP %	VPN %
Meijboom	105	87	98	74	93	89
JACC	83	53	100	84	80	100
2007	66	13	100	93	75	100
Husmann	34	68	100	75	89.5	100
Acad Rad	29	55.2	87.5	92.3	93.3	85.7
2008	25	29.4	90	79.2	64.3	95
Miller	291	56	85	90	91	83
NEJM 2008						
Hausleiter	243	41.6	99	75	74	99
EHI 2007	segment		95	90	50	99
Cademartini	72	28	100	98.1	95.2	100
Radiol Med	segment		100	98.6	71.1	100
2007						
Budoff	230	25	95	83	64	99
JACC 2008	vessel		84	90	51	99

Recommendations for current and future uses

AHA Scientific Statement

Noninvasive Coronary Artery Imaging Magnetic Resonance Angiography and Multislice Helical Tomographic Angiography

A Scientific Statement From the American Heart Association Committee on Cardiovascular Imaging and Intervention of the Council on Cardiovascular Radiology and Intervention, and the Council on Clinical Cardiology and Cardiovascular Disease in the Young

David A. Bluemke, MD, PhD, FAHA, Chief, Nuclear Medicine, MD, Matthew Budoff, MD, FAHA, Director, C. Clarke, MD, FAHA, Joseph Clark, MD, PhD, FAHA, David Drazner, MD, Dr. Giuseppe Quaino, MD, FAHA, Thomas J. Rhee, MD, FAHA, Joseph Ryan, MD, PhD, Matthew Taylor, MD, Francis W. Wolkstein, MD, FAHA

Bluemke DA et al. *Circulation* 2008

3. The potential benefit of noninvasive coronary angiography is likely to be greatest and is reasonable for **symptomatic** patients who are at **intermediate** risk for coronary artery disease **after initial risk stratification**, including patients with **equivocal** stress-test results. (Class IIa, level of evidence B)

Diagnostic accuracy favors coronary CTA over MRA for these patients. (Class I, level of evidence B)

Concerns regarding radiation **dose** limit the use of coronary CTA in **high-risk** patients who have a **very low pretest likelihood** of coronary stenoses; patients with a **high pretest likelihood** of coronary stenoses are likely to require intervention and invasive catheter angiography for definitive evaluation; thus, CTA is not recommended for those individuals. (Class III, level of evidence C)

Pronounced coronary **calcification** may negatively impact interpretability and accuracy of coronary CTA and thus, the usefulness of CTA is uncertain in these individuals. (Class IIb, level of evidence B)

1. Selezione del paziente

Aspetti non tecnici della metodica che influenzano l'indicazione all'utilizzo

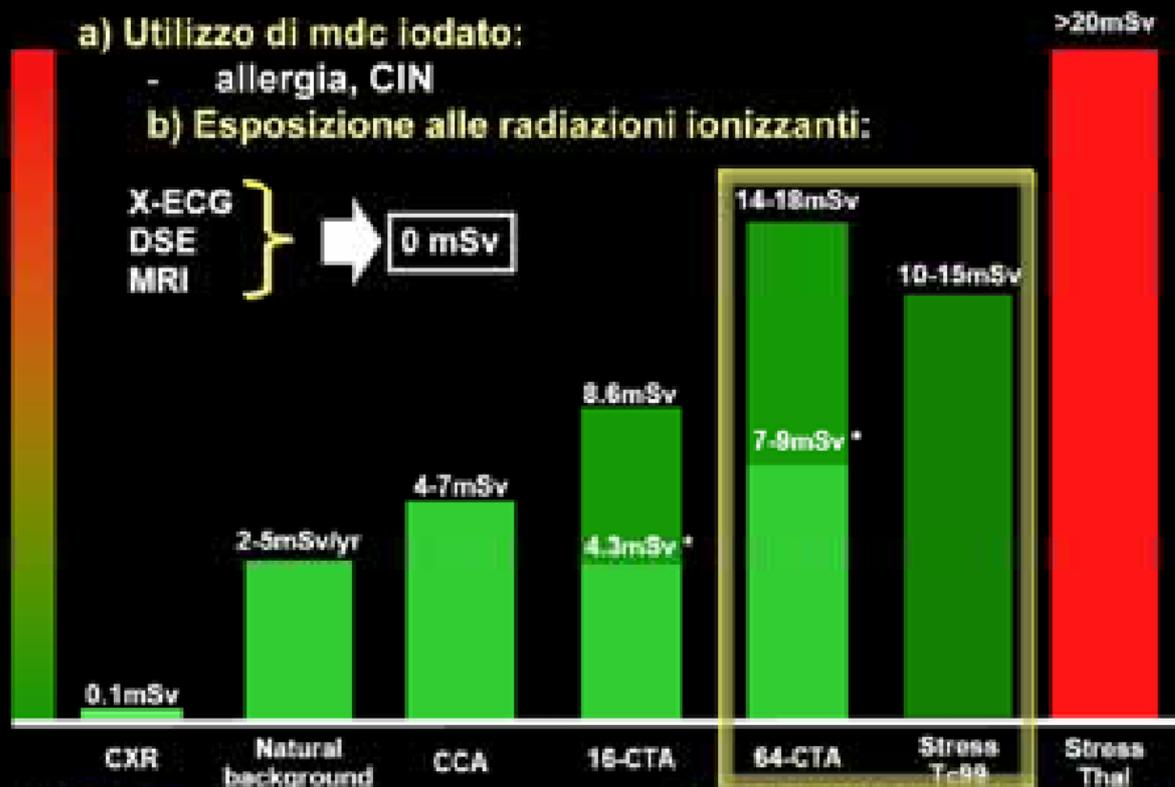


1b. Possibili effetti nocivi

a) Utilizzo di mdc iodato:

- allergia, CIN

b) Esposizione alle radiazioni ionizzanti:



* ECG-Pulsing

Picano E, *BMJ* 2003; Jakobs, *Eur. Radiology* 132

Evolution of cardiac-CT

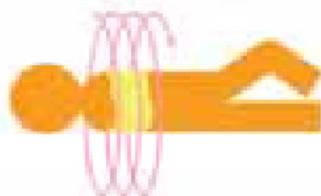


<i>Detector channels</i>	64	128	64	320
<i>Slice numbers</i>	64	256	128	320
		(flying focal spot)	(flying focal spot)	
<i>detector width</i>	0.625 mm	0.625 mm	0.6 mm	0.5 mm
<i>rotation time</i>	350 ms	270 ms	300 ms	350 ms
<i>volume coverage</i>	31.5 mm	80 mm	38.4 mm	160 mm
<i>image quality</i>		Dual Energy	Dual Energy	

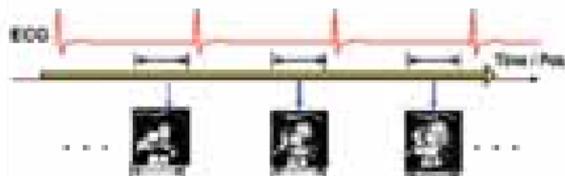
Loncoska L. *Show Me the Money – CT in 2008. MD Buyline*

Riduzione della dose

Retrospective ECG Gating

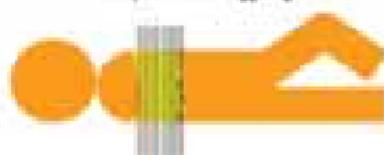


Continuous recording of spiral scan and ECG



Temporal Resolution 60 - 250 milliseconds
Radiation dose higher than prospective triggering

Prospective ECG Triggering



Conventional Axial "Partial Scan" (Stop and Breathe)



Temporal resolution 250 - 250 msec
Radiation dose minimized
Limited data set

SORGENTE	DOSE
Radiazione di fondo (range)	3mSv/anno (1-10mSv)
Stress ECG	0mSv
Stress ECO	0mSv
Stress RM	0mSv
RX torace – 2 proiezioni (range)	0.1mSv (0.05-0.24mSv)
TC Torace di Screening (bassa dose)	0.3-1.0mSv
TC Torace (standard)	3-8mSv
TC Addome (standard)	8-20mSv
TC Addome trifasica	15-30mSv
TC Toraco-Addominale trifasica (staging)	20-35mSv
CACS	3mSv (1-12mSv)
CTCA (media mondiale; range)	12mSv (8-20mSv)
CTCA (16-slice; standard spirale)	8-10mSv
CTCA (16-slice; standard spirale; modulazione della corrente)	5mSv
CTCA (64-slice; standard spirale)	14-18mSv
CTCA (64-slice; standard spirale; modulazione della corrente)	7-9mSv
CTCA (64-slice; ECG Prospettico)	1.2-5.0mSv
CTCA (Dual-Source; High-pitch spiral mode; 100kV)	<1mSv
SPECT Tc ^{99m} (stress-rest)	10-15mSv
SPECT Tha ²⁰¹ (stress-rest)	41mSv
SPECT Rb ⁸²	5mSv
PET F ¹⁸ - FDG	14mSv
CAG diagnostica (range)	7mSv (2-16mSv)
CAG interventistica coronarica (range)	15mSv (9-29mSv)
CAG interventistica ablazione radiofrequenza (range)	20mSv (7-57mSv)
Rischio incrementale di neoplasia per dose cumulative <100mSv	Non valutabile/non significativa*

1. Selezione del paziente

Aspetti non tecnici della metodica che influenzano l'indicazione all'utilizzo

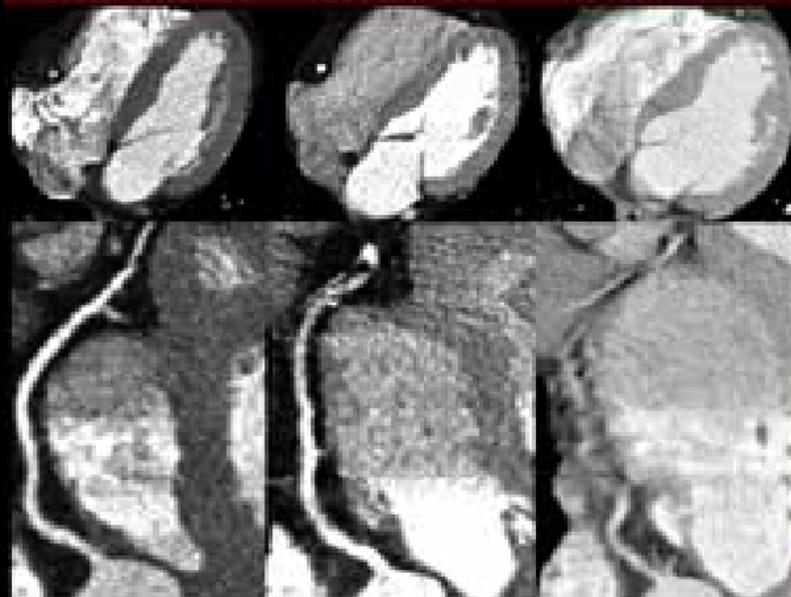


- a) Ritmo sinusale, regolare, stabile con FC < 60 bpm**

- b) Capacità di mantenere un'apnea compatibile con il tempo di scansione**

- a) Caratteristiche del paziente**
 - **Calcificazioni**
 - **BMI (< 30 Kg/m²)**
 - **Capacità di collaborare e mantenere la posizione idonea**

Frequenza cardiaca

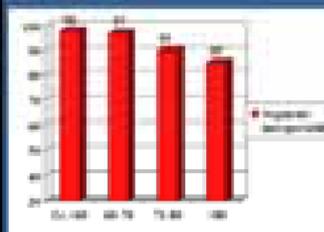


Heart Rate (HR)										
Number of interpretable segments										
HR	60-69	70-79	80-89	90-99	100-109	110-119	120-129	130-139	140-149	Total
Mean	100	95	90	85	80	75	70	65	60	750
SD	15	15	15	15	15	15	15	15	15	15
95th Percentile	115	110	105	100	95	90	85	80	75	900
90th Percentile	110	105	100	95	90	85	80	75	70	850
85th Percentile	105	100	95	90	85	80	75	70	65	800
80th Percentile	100	95	90	85	80	75	70	65	60	750
75th Percentile	95	90	85	80	75	70	65	60	55	700
70th Percentile	90	85	80	75	70	65	60	55	50	650
65th Percentile	85	80	75	70	65	60	55	50	45	600
60th Percentile	80	75	70	65	60	55	50	45	40	550
55th Percentile	75	70	65	60	55	50	45	40	35	500
50th Percentile	70	65	60	55	50	45	40	35	30	450
45th Percentile	65	60	55	50	45	40	35	30	25	400
40th Percentile	60	55	50	45	40	35	30	25	20	350
35th Percentile	55	50	45	40	35	30	25	20	15	300
30th Percentile	50	45	40	35	30	25	20	15	10	250
25th Percentile	45	40	35	30	25	20	15	10	5	200
20th Percentile	40	35	30	25	20	15	10	5	0	150
15th Percentile	35	30	25	20	15	10	5	0	0	100
10th Percentile	30	25	20	15	10	5	0	0	0	50
5th Percentile	25	20	15	10	5	0	0	0	0	0
0th Percentile	20	15	10	5	0	0	0	0	0	0

HR 49

HR 67

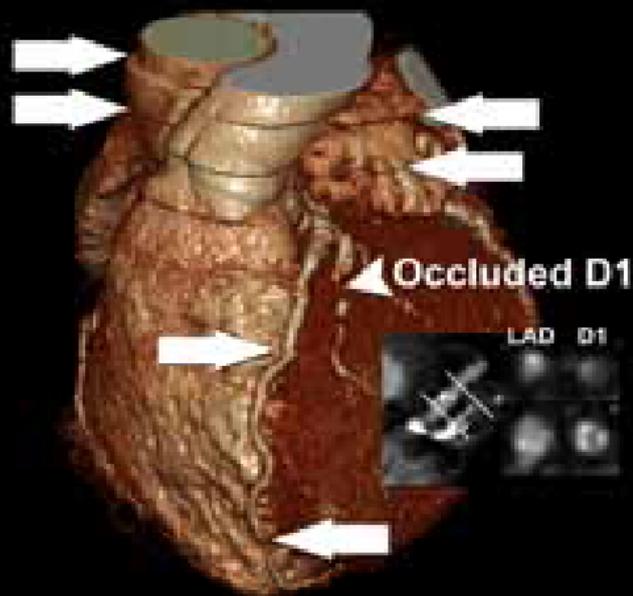
HR 82



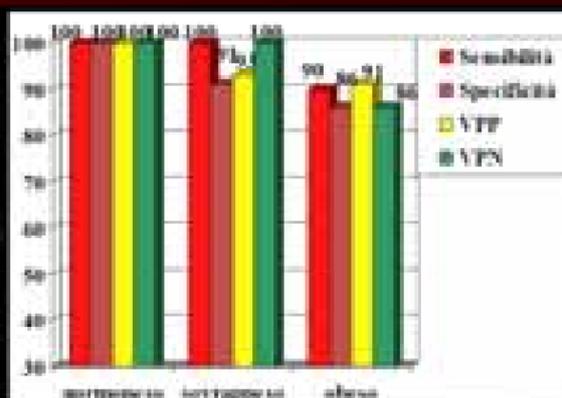
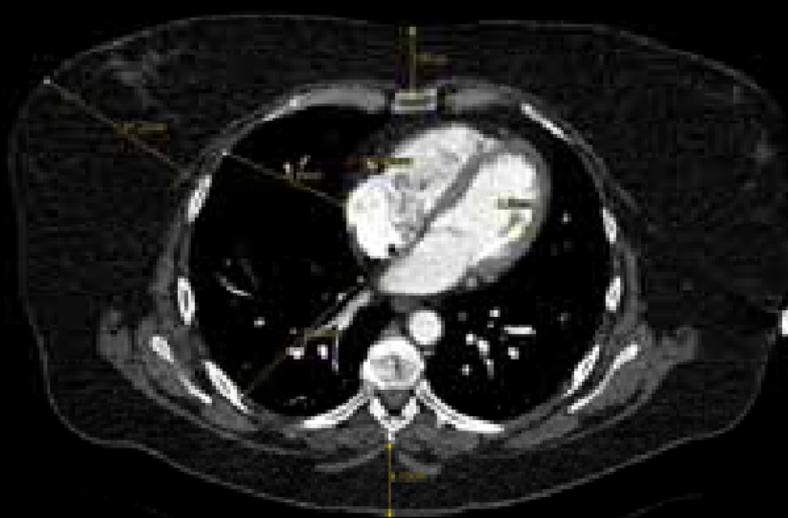
Il numero di segmenti interpretabili si riduce con l'aumentare della freq. cardiaca.

JAMA. 2006;295:2479-2479

Artefatti respiratori



BMI



JACC 2005, 46: 552-557.

Table 4. The Effect of Obesity on Diagnostic Accuracy of Coronary MSCT Compared to QCA

Body Mass Index	Sensitivity	Specificity	PPV	NPV
Normal (<25 kg/m ²) (n = 10)	3/3 (100%)	3/3 (100%)	3/3 (100%)	3/3 (100%)
Overweight (25-29.9 kg/m ²) (n = 25)	14/14 (100%)	18/11 (91%)	14/11 (93%)	10/10 (100%)
Obese (≥30 kg/m ²) (n = 31)	19/21 (90%)	12/14 (86%)	19/21 (91%)	12/14 (86%)

Values are n/N. Weight classification as per Kishimoto et al. (11). Abbreviations as in Table 2.

Calcificazioni

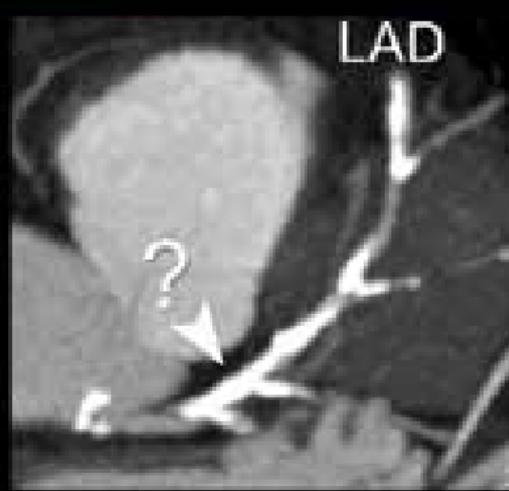
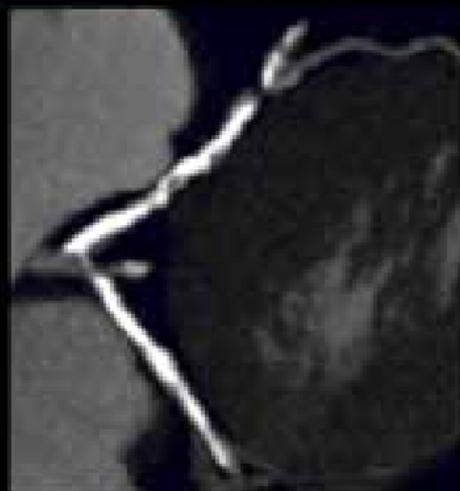


TABLE 3. Influence of Coronary Calcification on Diagnostic Accuracy of 64-Slice CT Coronary Angiography on a Segment-Based Analysis

Calcium Score	n	Mean (\pm SD) Agatston Score	Mean (\pm SD)				Sensitivity, %	Specificity, %	Positive PV, %	Negative PV, %
			TP	TN	FP	FN				
0-10	12	0 \pm 0	8	17	2	0	100 (83-100)	99 (91-99)	80 (44-92)	100 (87-100)
11-400	21	174 \pm 122	26	240	13	0	100 (80-100)	95 (91-97)	73 (58-85)	100 (98-100)
401-1000	12	718 \pm 168	31	126	10	1	87 (63-96)	93 (87-96)	78 (59-89)	96 (85-98)
>1000	6	1771 \pm 821	18	61	5	0	100 (81-100)	92 (83-97)	78 (58-93)	100 (94-100)

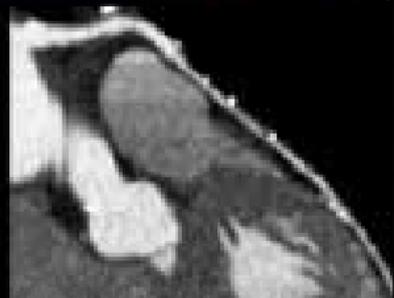
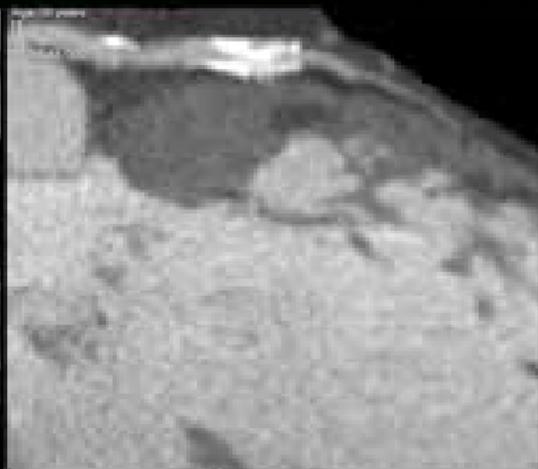
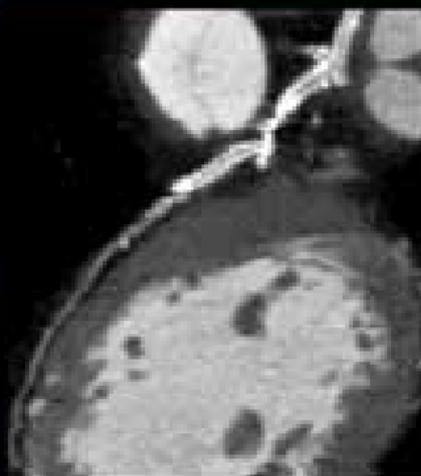
TP indicates true positive; TN, true negative; FP, false positive; FN, false negative; and PV, predictive value. Values in parentheses represent 95% CI.

1. Selezione del paziente

Aspetti non tecnici della metodica che influenzano l'indicazione all'utilizzo



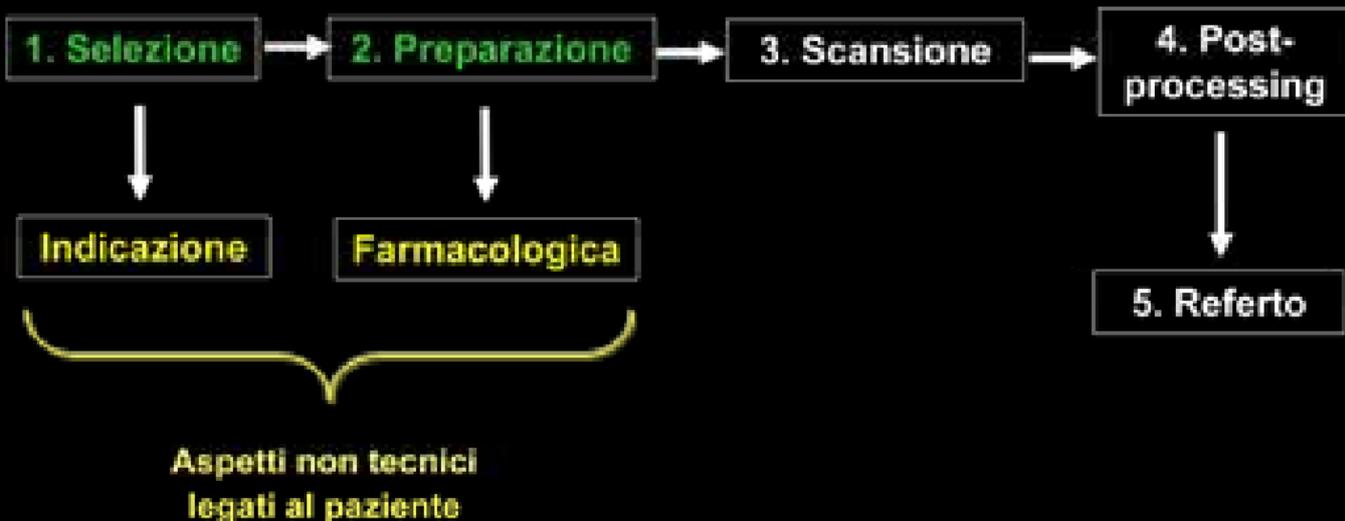
1d. Situazioni cliniche particolari



Characteristic	Complication
High-density stent material (stents)	High-density artifacts or blooming
Small stent and vessel size	Small artifact-free lumen
Limited spatial resolution	
Spiral scan mode	Wide-based SSP, increased partial volume
Heterogeneous kVp spectrum	Beam hardening artifacts
Residual cardiac motion	Motion artifacts
Location within the chest	Increased image noise



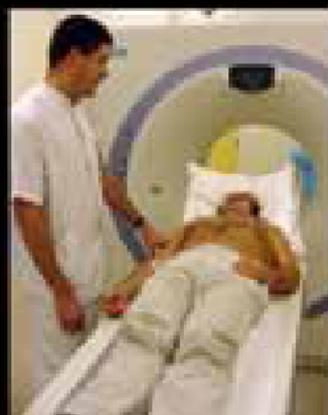
Pianificazione ed esecuzione di un esame di Cardio - TC



Aspetti non tecnici
legati al paziente

2. Preparazione del paziente

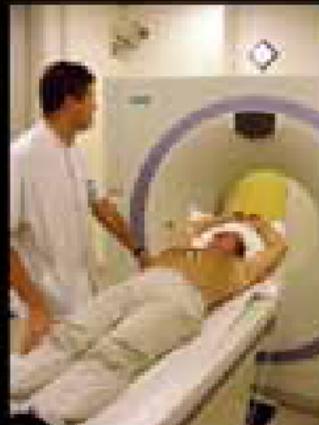
- Istruzione del paziente
 - Svolgimento della procedura
 - Collaborazione
 - Digiuno da almeno 6 ore
 - non deve aver assunto the, caffè, coca-cola, etc.
 - non deve aver fumato
- Riduzione della frequenza cardiaca < 60 bmp
 - Gestione farmacologica
- Manovre respiratorie
 - Test di apnea: compatibilità con il t di scansione
 - Evitare manovra di Valsalva
 - Comportamento della frequenza cardiaca durante l'apnea
- Posizionamento
 - Paziente, elettrodi, accesso venoso



Istruzioni



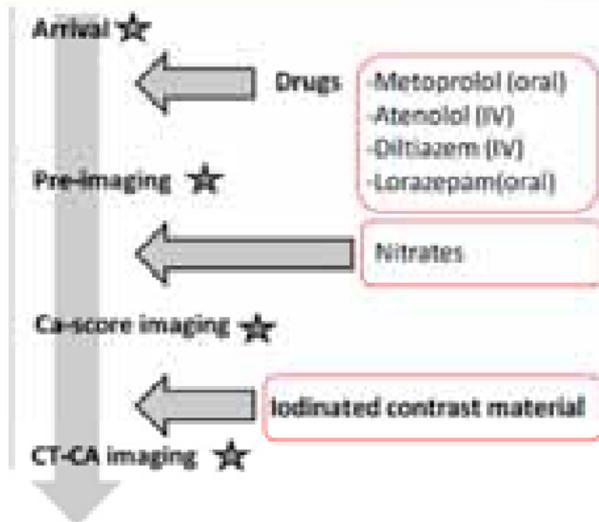
ECG



Test di apnea



Gestione farmacologica del paziente



CAJG
www.elsevier.com

CAJG

Coronary
Artery
Disease
Journal
Volume 10, Number 1
February 2010
Pages 1-10
ISSN 1078-5659
DOI: 10.1016/j.cajg.2010.01.001

"In-house" pharmacological management for computed tomography coronary angiography: heart rate reduction, timing and safety of different drugs used during patient preparation

Farmaci



- **β -bloccanti:** per os o e.v. (atenololo, metoprololo)
- **Ca-antagonisti:** in caso di controindicazione ai β -bloccanti
- **Ivabradina:** in caso di ipotensione
- **Benzodiazepine:** soggetti giovani, emotivi, ansiosi (lorazepam)
- **Nitrati:** isosorbide di-nitrato (per os, s.l., spray) coronaro-dilatazione vasi più distali distali
- **Antiarritmici**





Preparazione dell'iniettore



Connessione al paziente

3. Scansione

Beta-blockers

<60



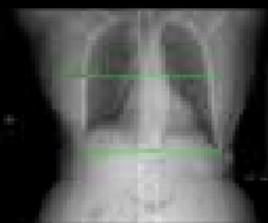
70-90 cc
4-5 cc/s



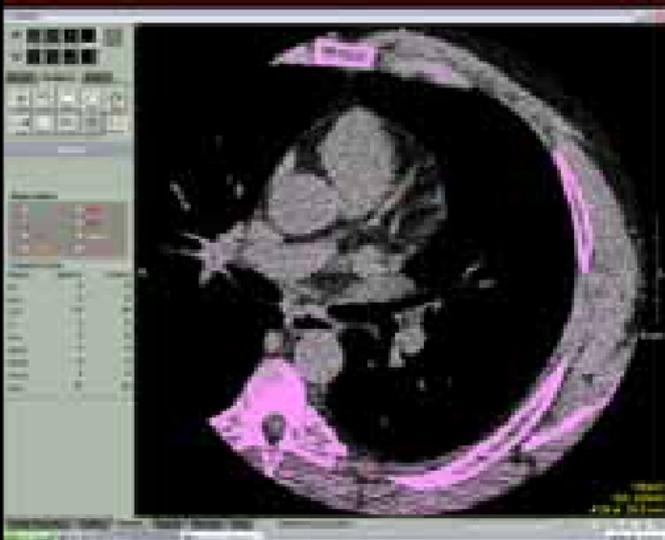
Table Feed



8-10 sec



Calcium score



AJ Scoring Algorithm

AJ Score = Total pixel area (mm²) of calcified pixels * W (weighting factor of the mean intensity pixel in the group)

AJ 1.00 Score=0.01 for calcified pixels in 1.00-0.27 AJ 1.00 Score=0.01 for calcified pixels in 0.27



100 = 5x5x5 (Total Volume)

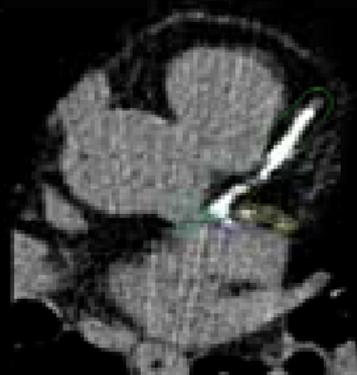
Mean Intensity Pixel	Weighting Factor
0.00-0.27	1
0.27-0.54	2
0.54-0.81	3
0.81-1.00	4

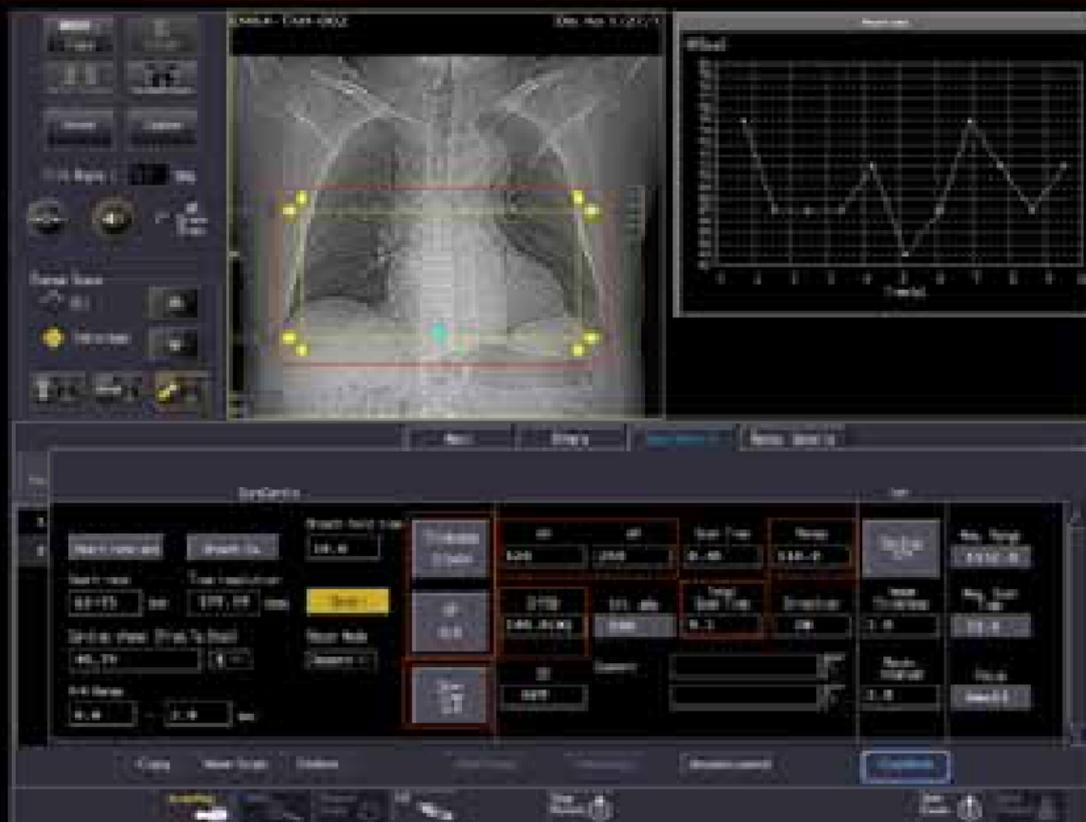
Example for above slice:

Mean intensity pixel = 0.11 = weighting factor of 1 for entire group

AJ 1.00 Score = (50 pixels * 0.0001) * 1 = 0

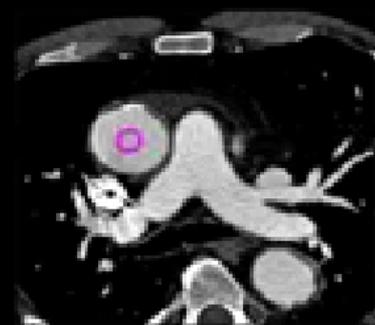
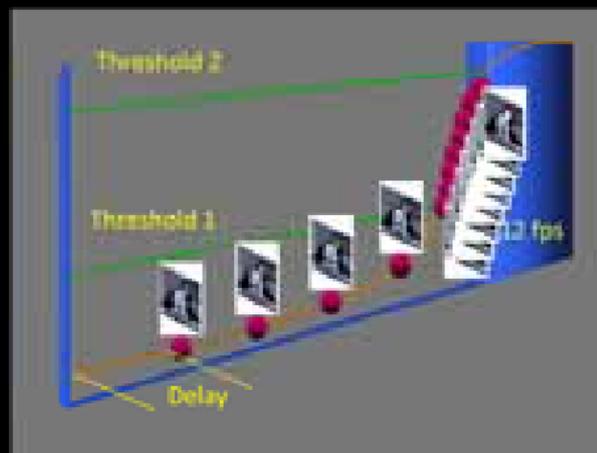
AJ 1.00 Score = 1.0 (see table)



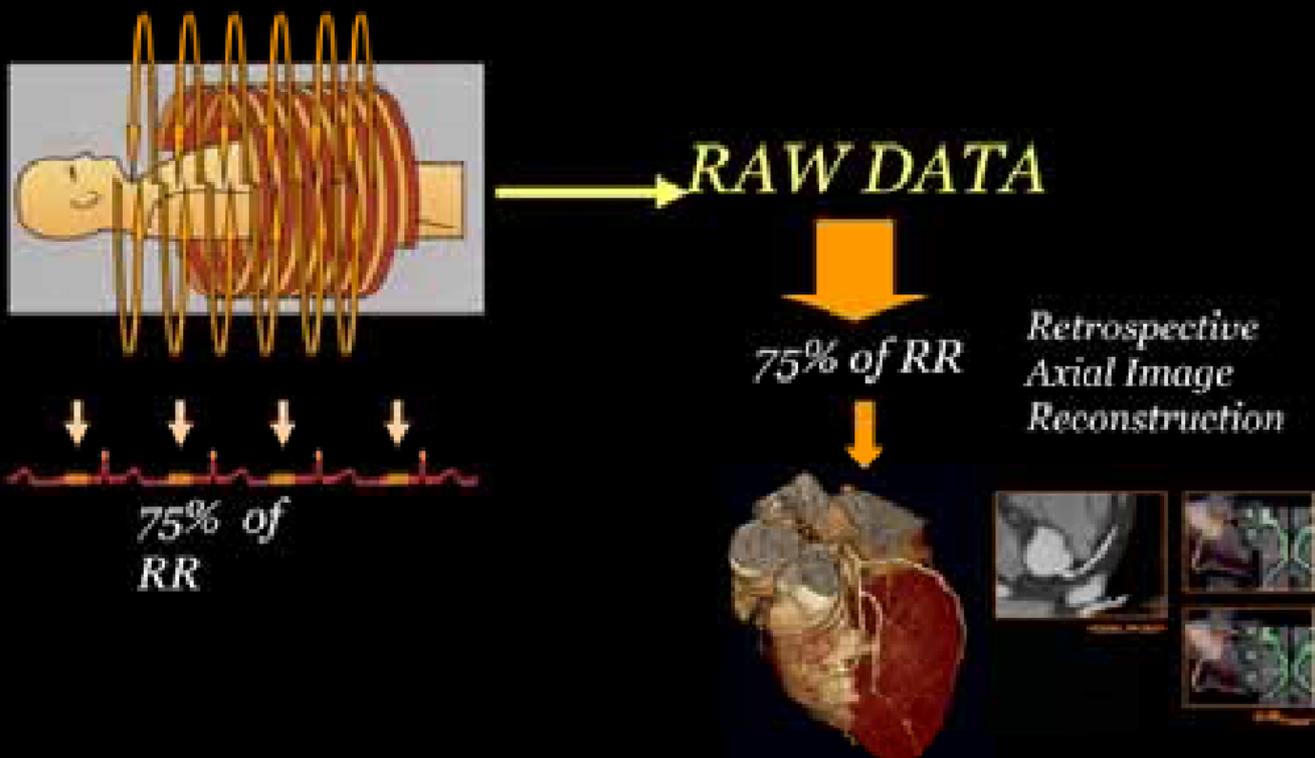


Iniezione del MDC

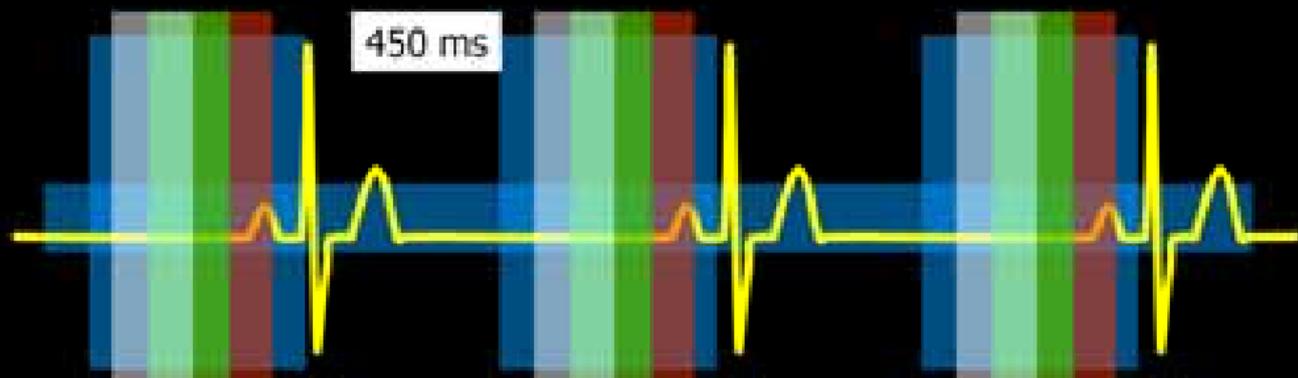
- **Protocollo di iniezione**
 - 80 - 100 ml @ 4,5- 5,5 ml/s
 - Fisiologica, 30 ml @ 4,5- 5,5ml/s
- **Monitoring scans**
 - Aorta Ascendente
 - In inspirazione
 - Scan delay: 5 sec



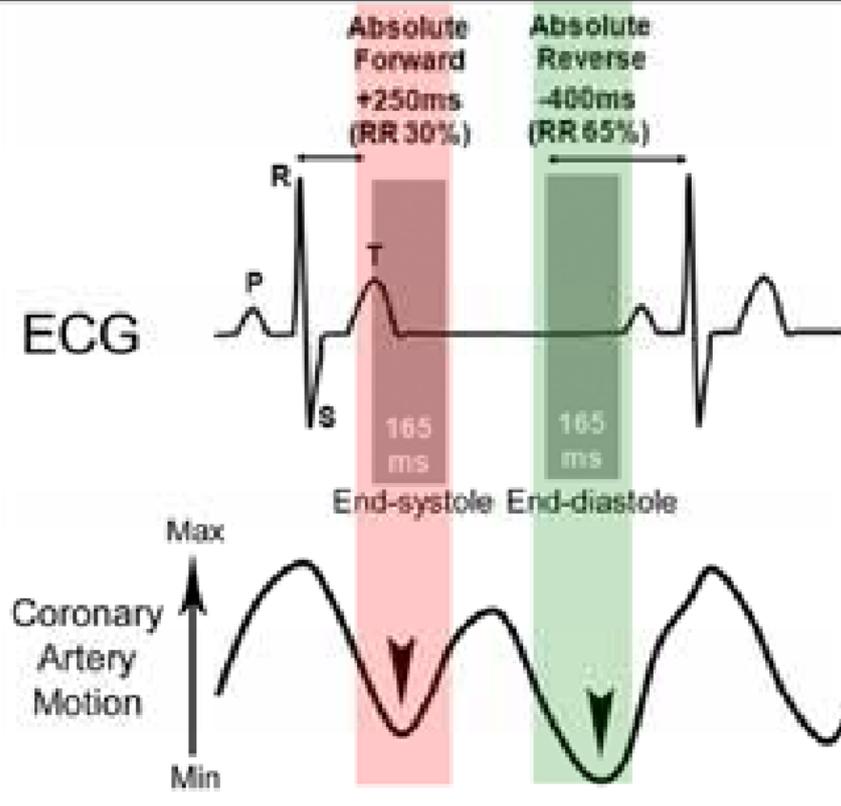
4. Rielaborazione dati



sincronizzazione ECG



ECG



Fase ottimale di ricostruzione

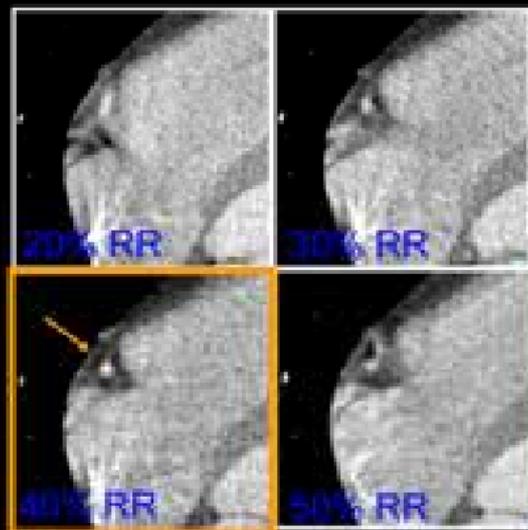
Average Starting Points for Image Reconstruction in CT Coronary Angiography

Anatomic Location	Relative Timing		
	Low Heart Rates R-R Distance (%)	Elevated Heart Rates R-R Distance (%)	Cutoff Heart Rate (beats/min)
RCA			
Proximal segment	59.9 (40-75)	26.5 (10-35)	67.0
Medial segment	59.4 (50-70)	26.3 (10-45)	67.0
Distal segment	59.8 (50-70)	26.3 (15-35)	67.0
Mean	59.7 (40-75)	27.0 (10-35)	67.0
LCA			
Proximal segment	62.2 (55-75)	26.3 (10-35)	67.0
Medial segment	61.8 (45-70)	26.3 (15-40)	67.0
Distal segment	60.8 (45-70)	27.7 (15-35)	68.5
Mean	61.6 (45-75)	27.4 (10-40)	67.5
LCX			
Proximal segment	62.2 (55-75)	26.3 (10-35)	67.0
Medial segment	61.8 (45-70)	26.3 (15-40)	64.0
Distal segment	60.8 (45-70)	27.7 (15-35)	67.0
Mean	61.6 (45-75)	27.4 (10-40)	66.0
All arteries			
Proximal segment	61.4 (40-75)	26.4 (10-35)	67.0
Medial segment	61.0 (45-70)	26.3 (10-45)	66.0
Distal segment	60.5 (45-75)	27.2 (10-45)	67.5
Mean	61.0 (40-75)	27.3 (10-45)	66.8

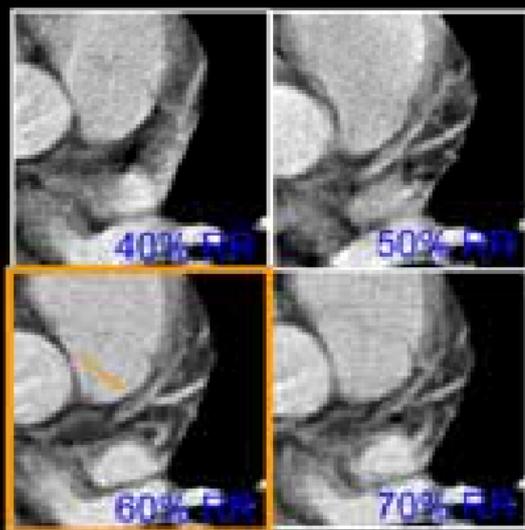
Fase ottimale di ricostruzione

RCA-Series 20%, 25%, ... 60%

LAD-Series 40%, 35%, ... 80%



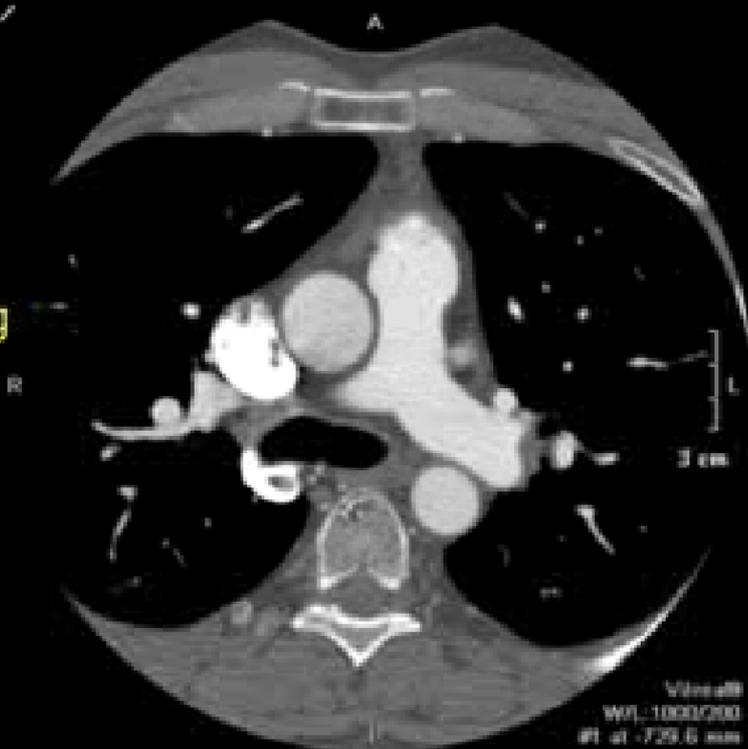
RCA: Optimal Time at 40%



LAD: Optimal Time at 60%

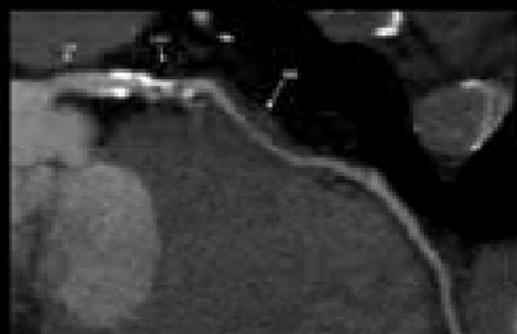
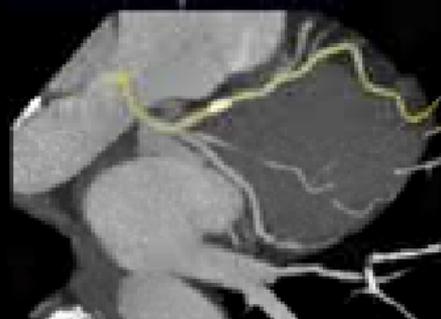
Analisi delle immagini

- Immagine sorgente
- MPR
- Curved MPR
- Thin MIP
- 3D-Volume Rendering
- Vessel Tracking
- Studio funzionale



**IMMAGINE
SORGENTE
ASSIALE**

RICOSTRUZIONI MPR



Kernel e filtri

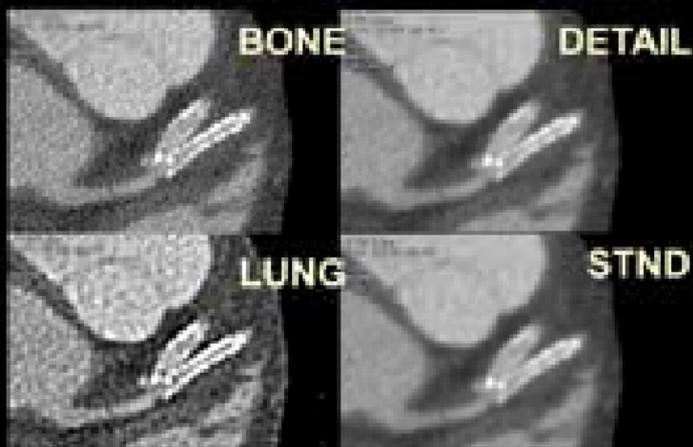


Table 5 Components of comprehensive gated, contrast-enhanced cardiac CT reporting

Section	Specific Component(s)
<i>Clinical Data</i>	
General	Indication or reason for test, procedure date
Demographics	Name, date of birth, sex, referring clinician Height, weight
History	Symptoms, risk factors, relevant diagnostic tests
<i>Procedure Data</i>	
Description	Test type (eg, coronary CT angiography, calcium scoring, ventricular function, pulmonary vein, other)
Equipment	Scanner type; Number of detectors, rotation time
Acquisition	Gating method Tube voltage, dose modulation (if used) Estimated radiation dose
Reconstruction	Slice thickness Slice increment, reconstruction filter, phases of cardiac cycle
Medications	Contrast type, volume, β -blockers, nitroglycerin, or any other, if given Contrast rate
Patient parameters	Complication(s), if present Heart rate, arrhythmia, if present

Results	<ul style="list-style-type: none"> Technical quality Overall quality Presence and type of artifact and effect on interpretation Calcium score (if calcium scan performed) Coronary anomalies (origins and course), if present Stenosis location and severity Uninterpretable segments, arteries, or overall study Stenosis plaque type: Calcified, noncalcified, mixed Stenosis extent: dilatation, length, axial or branch involvement, positive remodeling, tortuosity recommended Use of SOCT stenosis severity classification Use of SOCT axial coronary segmentation model Calcium score percentile (if calcium scan performed) Use of AHA or CASS coronary segment model
Non-coronary Vessels	<ul style="list-style-type: none"> Abnormalities of aorta, vena cavae, pulmonary arteries, pulmonary veins, if present Pulmonary vein morphology and ostia sizes (required for pre-ablation studies)
Cardiac chambers	<ul style="list-style-type: none"> Abnormal chamber dilation, masses, thrombus, shunts, and other structural disease, if present Left ventricular size and volume (if function data obtained) Left atrial volume (for pre-ablation studies) Right ventricular size and volume (if functional data obtained) optional
Non-coronary Myocardium	<ul style="list-style-type: none"> Left ventricular wall motion (17 segment model) Left ventricular ejection fraction (if functional data obtained) recommended End-diastolic left ventricular wall thickness recommended
Pericardium	<ul style="list-style-type: none"> Abnormal thickness, calcification, effusion, if present
Valves	<ul style="list-style-type: none"> Abnormal aortic and mitral valve calcification, thickness, if present
Non-cardiac	<ul style="list-style-type: none"> Abnormalities in lungs, mediastinum, esophagus, bony structures, chest wall, etc, if present
Interpretation and Conclusions	<ul style="list-style-type: none"> Coronary interpretation Abnormal non-coronary cardiac findings Abnormal non-cardiac findings Non-coronary cardiac interpretation (ventricular function, etc) Correlation to other or prior cardiac studies Documentation of communication to referring physician for urgent finding(s) Clinical recommendations
Images	<ul style="list-style-type: none"> Representative coronary segments



Grado di stenosi: metodo binario

Table 1. Proposed Grading Systems for Luminal Diameter Stenosis in Coronary Computed Tomography Angiography

Cheng et al. (12)		Cury et al. (10)		Goldstein et al. (13)	
Grade	Luminal Diameter Stenosis	Grade	Luminal Diameter Stenosis	Grade	Luminal Diameter Stenosis
1	<25%	Mild	0%–40%	1	1%–25%
2	25%–49%	Moderate	41%–70%	2	26%–50%
3	50%–69%	Severe	71%–100%	3	51%–70%
4	70%–89%			4	71%–99%
5	≥90%			5	100%

No stenosis

Non-significant < 50%

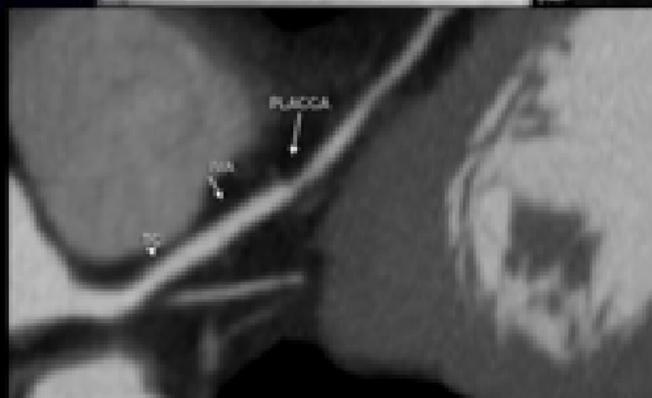
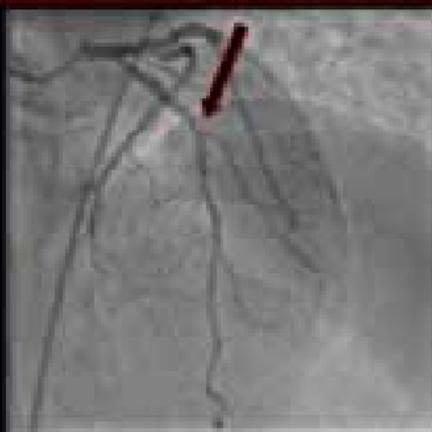
Bordreline = 50%

Significant > 50%

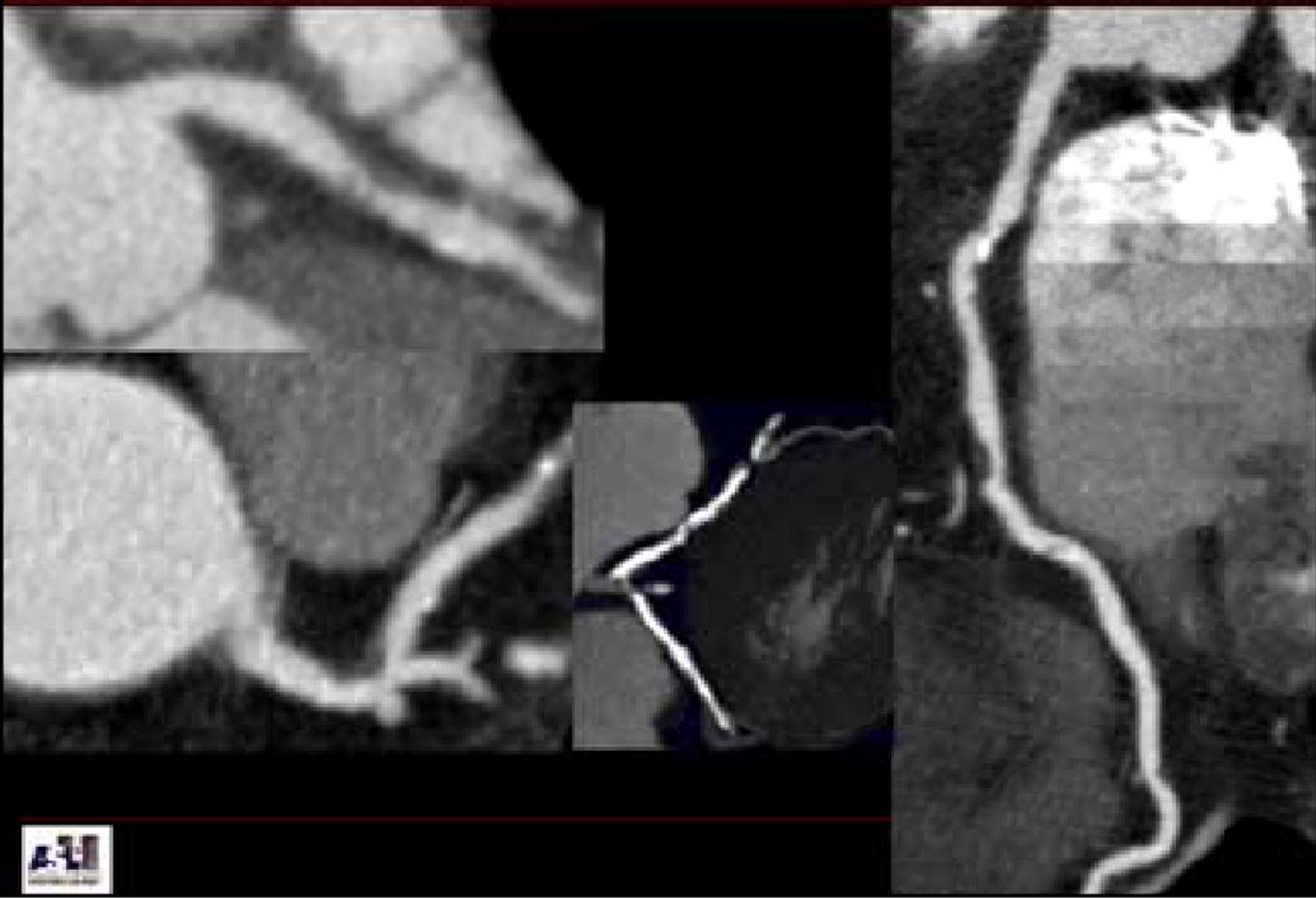
Occlusion = 100%



Grado di stenosi



Caratterizzazione della placca





Azienda Sanitaria Locale Napoli 1
Presidio Ospedaliero "San Gennaro"

Via San Gennaro alle Pigne, n. 25 - 80138 Napoli
Tel: - 081 254 5027 - 081 254 50 44 - 081 254 5001



C. S. G.

Unità Operativa di Radiologia

Direttore: Dr. Roberto Pepe

Unità Operativa di Cardiologia

Direttore: Dr. Paolo Capogrossi

Tomografia Computerizzata del Cuore

Patient ID: 90061148	Cognome Nome:
Data esame: 22/1/2009	Età: 45 anni



ANAMNESI PATRIMONIALE CARDIOLOGICA

Paziente preteso, delirico, non diabetico. Ex fumatore. Famiglia positiva per CAD. Disordini atopici da sforzo con astinazione. ECG a riposo: Segni di IVS, anomalie diffuse della ripolarizzazione. Elettrocardiogramma: ipertrofia VS, prolasso valvolare mitralico. Recente test ergonomico dubbio per segni ECG (sottosviluppamento ST, 1 mm circa in VI-V6).

PROCEDURA

Cuore scansiono con scanner Toshiba Aquilion 63 mediante iniezione ECG e scansioni ventri (16 x 2,5 mm), dopo iniezione di mezzo c.c. di Omniprol 40%. Gli immagini sono state analizzate mediante studio delle immagini axial, coronari, ricostruzioni multiplanari (MPR) AXI-cune, ADP e 3D volume-rendering.

RISULTATI

Frequenza cardiaca pre-scans/scans: 50 bpm	Tempo di scansione: 20 s
Procedura azione: stimolo per os	Qualità dell'immagine: discreta
Calcium score Agatston: 15	Calcium score volume: 21



Procedura: Angio TC per CA	Qualità dell'esame: Buona
Link con storia Agilent: 21	Calibro stenosi volumi: 21

Coronaria destra

Algoritmo fase di studio: 80 % di ciclo R-R

Arteria coronaria destra: vaso dominante, ad origine vertebrale, con evidenza di placca non calcifica con remodeling positivo a livello del tratto prossimale-mede risultante stenosi < 50%. Altre placca non calcifica non significativa (stenosi < 50%) si evidenzia al tratto distale (cosmamente alla curva). **Ramo interventricolare posteriore:** tortuoso e di buon estensione. **Ramo postero-laterale:** breve e bifurco

Coronaria sinistra

Algoritmo fase di studio: 75 % di ciclo R-R

Tronco comune: vaso ad origine craniale di buon calibro senza aterosclerosi significativa.

Arteria interventricolare anteriore: vaso di buon calibro ad estensione con placca mista (prevalentemente non calcifica) all'origine non significativa (stenosi < 50%). Il tratto distale supera l'apice e raggiunge il solco interventricolare posteriore. Si visualizza due rami diagonali bifurco.

Ramo intermedio: bifurco

Arteria circonflessiva: vaso di buon calibro all'origine, a decorso tortuoso. Il tratto distale appare di piccolo calibro, senza aterosclerosi significativa

Si visualizza un **tratto marginale ostato di buon calibro**, senza aterosclerosi significativa

Conclusioni

Placca non calcifica con remodeling positivo del vaso a livello del tratto prossimale-mede della **coronaria di destra** con stenosi < 50%.

Placca mista (prevalentemente non calcifica) all'origine dell' **arteria interventricolare anteriore** non significativa (stenosi < 50%).

Il Radiologo
Dr. R. De Rosa

Il Cardiologo
Dr. C. Tedeschi

Conclusioni

- L'ottenimento di immagini di qualità diagnostica non dipende solo dalla tecnologia disponibile
- La selezione e la preparazione del paziente rivestono un'importanza rilevante
- La buona riuscita dell'esame si ottiene in centri specializzati e di grande esperienza con equipe cardio-radiologica dedicata e dotata di solido background cardiologico e radiologico.

Grazie per la vostra attenzione

U.O. Cardiologia

Direttore: Dr. P. Capogrosso

P.O. "San Gennaro"



U.O. Radiologia

Direttore: Dr. R. Pepe



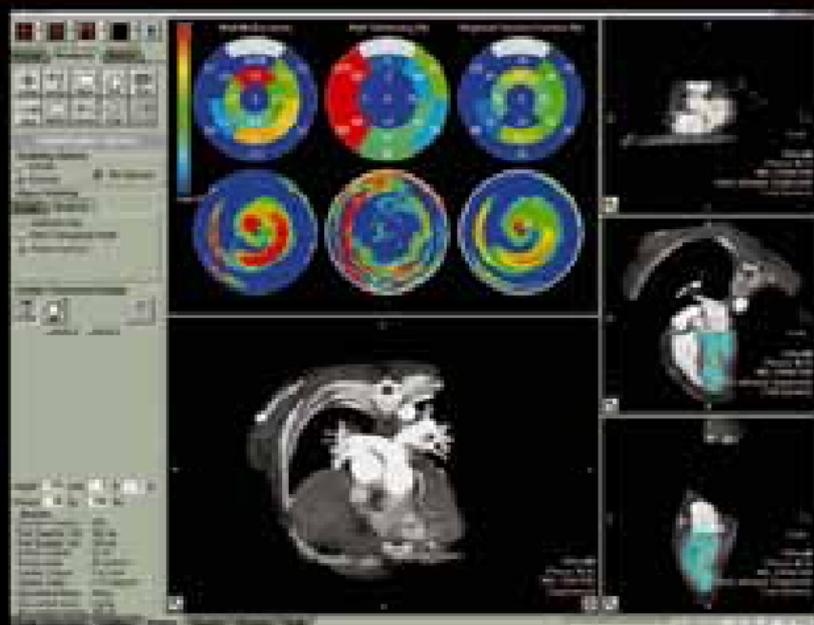
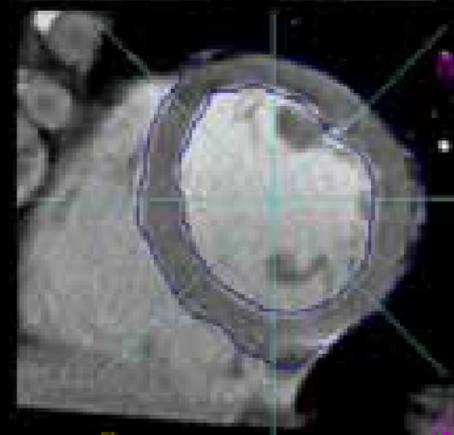
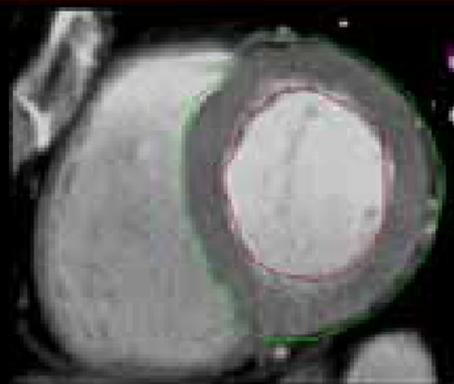
Selezione del paziente

Preparazione del paziente

Equipe cardio-radiologica

Dr. Carlo Tedeschi – Dr. Gennaro Ratti - Dr. Roberto De Rosa





Volumi ventricolari tele sistolici e tele diastolici.
Frazione di eiezione.
Massa miocardica.